What is claimed is:

1- A semiconductor device comprising:

a plurality of semiconductor chips having an active and an inactive surface in a vertical stack;

said chips including at least two flip-chip pairs having their active surfaces bonded face-to-face;

a substrate having a plurality of bond pads and interconnection circuitry, and

a plurality of conductive connections between said chips and said substrate.

2- The device of claim 1 wherein said flip-chip pairs comprise a base chip with said active surface facing upward and having exposed bond pads, a chip with said active surface facing downward, and a plurality of conductive flip-chip bonds interconnecting said active surfaces.

3- The device of claim 1 wherein the inactive surfaces of said chips are adhered to said substrate or to the inactive surface of a successive chip pair by a polymeric adhesive.

4- The device of claim 1 wherein each of said chips having an upward facing active surface is connected to bond pads on said substrate.

5- The device of claim 1 wherein one chip in a chip pair includes a memory circuit, such as RAM, flash or buffer storage unit.

6- The device of claim 2 wherein said interconnection by flip-chip bonds includes solder bumps.

7- The device of claim 2 wherein said interconnection by flip-chip bonds includes an anisotropic conductive material.

8- The device of claim 1 wherein patterned circuitry on said substrate includes interconnections between each of said chips connected to the substrate.

9- The device of claim 1 wherein said plurality of semiconductor chips coupled with said substrate comprises a functional electronic system.

10- The device of claim 2 wherein said connections between said chips and substrate comprise wire bonds.

11- The device of claim 2 wherein said connections between said chips and substrate comprise TAB bonds.

12-The device of claim 2 wherein said flip-chip bonds interconnecting said chip pairs includes rerouting of conductors on the active surface of one or both chips.

13- The device of claim 1 wherein said semiconductor chips include a video chip, an audio chip, a controller chip, and two or more flash memory chips.

14- The device of claim 2 wherein the area between conductive bonds includes an underfill material.

15- The semiconductor device of claim 1 wherein said substrate is a BGA package substrate.

16- - A semiconductor device comprising:

a multilayer BGA package having a plurality of bond pads and interconnection circuitry, a plurality of semiconductor chip pairs connected face-to-face in a vertical stack, wherein each of said chips has an active and an inactive surface, and a plurality of connections between said chips and package bond pads.

17- The device of claim 16 wherein said BGA package includes multiple layers of conductors and bonding lands on different tiers.

18- The device of claim 16 wherein said package includes contacts to a second level of interconnection.

19- A process for assembling a vertically stacked semiconductor device including more than one flip chip pairs comprising the following steps:

providing a substrate having a plurality of bond pads and interconnections between said pads,

attaching the inactive surface of the first chip to said substrate by a polymeric material,

aligning the active surface of the second chip to the active surface of the first chip and bonding the active surfaces by flip chip bonds to form a chip pair,

interconnecting exposed bond pads of the first chip to the substrate bond pads,

adhering the inactive surface of the third chip to the inactive surface of the second chip,

aligning the active surface of the fourth chip to the active surface of the third chip and bonding the active surfaces by flip chip bonds to form a second chip pair, and

connecting exposed bond pads of the third chip to the substrate bond pads.

20- The process of claim 19 wherein said flip chip pairs are preassembled by aligning and flip chip bonding prior to positioning in said chip stack.